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# Public Health Reports

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### STEAM DISINFECTION.

*The comparative efficiency in a steam chamber of flowing steam and of steam with a vacuum—By H. R. Carter, Surgeon, U. S. M. H. S.*

HAVANA, CUBA, April 13, 1900.

Relative to the observation by Passed Assistant Surgeon Smith, of this Service, on the use of "Flowing steam" in disinfection in Hamburg, I would say that the same device was used by this Service for the same purpose at the Gulf Quarantine Station in 1889. Observations at a neighboring station having shown that steam introduced into cylinders under pressure, but without continuous outlet, left "dead spaces" of less than 212° F. (180° F., if I remember aright, in one case, the thermometer registering 230° F. in a chamber) and penetrated pillows, mattresses, rolls of cotton quilts, etc., very slowly; the attempt was made at this station, Gulf Quarantine, to remedy this (slow penetration) by turning on a considerable head of steam and allowing it to escape freely, but little pressure in the chamber being aimed at. At first several (4) outlets were provided which were closed or opened at will so as to direct the steam to or from any part of the (rectangular) chamber. This was found to be unnecessary as good results (as far as "dead spaces" were concerned) were by letting the four run at such a degree of opening as to register 214–216° F. in the chamber—about 1½ to 4 lb. pressure.

We found that the articles which had been penetrated slowly by still steam were penetrated rapidly by flowing steam. Of these test articles the wads of cotton quilts were the most difficult to penetrate and feather pillows the next. Mattresses such as we had, were penetrated readily, and blankets, under any condition of roll or wad, very readily. Indeed, in the latter, the electric thermometer would ring (100° C.) almost as quickly as in the open. These observations were made with two electric thermometers, giving the time at which 100° C. was reached, and I have had no opportunity to compare them with the use of the vacuum by any as accurate a method, although many observations, fairly accurate,

have been made. I feel sure, however, that the same degree of penetration is reached more quickly by the preliminary use of a vacuum than by flowing steam alone. Of course, in using our present chambers we use the flowing steam after the vacuum is broken by introducing it, leaving the bleeders partly open and keeping up a pressure which gives a temperature of 218–225° F. in the chamber.

The method by flowing steam leaves little to be desired as regards efficiency—*i. e.* penetration—as compared with the vacuum method, provided articles be hung up or loosely packed, taking more time, however, for pillows, quilts, etc. Where, however, it is desirable to lay fabrics flat, which is necessary with the clothes of first-class passengers to prevent wrinkles, creases, etc.; or where we must put a large amount of clothing in a chamber the vacuum offers advantages, which are, to my mind, very considerable. With a chamber the same size the same amount of efficient work can be done in much less time with the vacuum than without and the work will be less injurious, as the goods will come out with the same folds they had in the trunk.

Naturally a second, or even a third, vacuum followed by steam under pressure can be used to insure greater penetration where the articles are very closely packed. As a rule, however, close packing results, in spite of the drying vacuum, in getting the fabrics out too wet to pack in the trunks and no time is gained.

Of the advantage of the drying vacuum (we usually use 2 drying vacuums) at the end of disinfection, it is not necessary to speak, except to say that in the method by flowing steam the fabrics are usually so loosely disposed that they dry as well, or nearly as well, as with the drying vacuum. If packed in the chamber they come out decidedly less dry than if the vacuum be used. If the air used to break the drying vacuum could be introduced *hot* it would add very much to the drying power of the vacuum, and I have written to Mr. Francis suggesting a (possible?) plan for doing this. It is also all important to have no water on the floor of the chamber—*i. e.*, for it to drain perfectly.

It is to be noted that the greater the penetration of the steam, the greater is the amount of steam in the fabric, and if it be condensed, the *wetter* it is; and I have often had my attention called to the “beautiful dryness” of the articles coming out of a steam chamber, when really it was due to the fact that they had never been penetrated by steam; had never had vapor of water in their meshes—*i. e.*, the disinfection was inefficient.

The first vacuum then *tends to wet fabrics*, and we must depend on the drying vacuum to correct this.

Where there is room enough for a large chamber and the articles to be handled are mainly seamen's clothes and bedding the method by flowing steam is good, probably the best; as little skill being needed, each owner unpacks and packs his baggage, a decided advantage here. But for passenger work, where room is scarce and the work heavy, the vacuum offers very great advantage, indeed, I count it necessary. It requires, as do most improved apparatus, more skill and much more care to use it properly (without injury to fabrics) than the other method. With care it gives far better results.

The writer has tried many methods of getting a vacuum. The air pump; the condenser connected with the chamber, using first the principle of the surface condenser and then a small chamber (or rather drum) as a condenser in which a jet of water was thrown over a cone; and lastly, the steam jet.

While the best vacuum work he has ever seen was done with the

air pump, yet the use of the steam jet for this purpose, which we owe to Chas. Valk, of Charleston, is what renders this method really practicable. No other method is even second to it, and without it we had as well use the old Geneste-Hirshe chamber.

On a portable Francis-Kinyoun, however, at New Orleans used in disinfecting the mail, a drying vacuum was habitually obtained of from 23 to 25 inches, and occasionally, to show what we could do, 26½ inches. This was, however, after very considerable alteration of the piping and pump from its original arrangement. Indeed the air pump cylinder was used here as a jet condenser as well as an air pump.

The difference between the steam jacket and the manifold (radiator), is simply one of degree and is of no very special importance.

*Report on the inspection of smallpox in Georgia.*

March 10, 1900: I reported for duty to the governor of Georgia and was directed to proceed to Greensboro, Ga., and examine some suspicious eruptive disease there, about which the local physicians differed in their diagnoses.

March 11: I went to Greensboro, met the mayor who had requested his excellency the governor to have some one who had had experience in treating smallpox go there and report upon the nature of the disease under dispute. I examined 1 recently developed case and 2 persons convalescing from the disease (the only cases then in the town) and pronounced the disease smallpox. The cases examined were among negroes, but it was reported that 2 cases had developed among the whites, who were the first to introduce the disease into Greene County, bringing the infection, it is thought, from Putnam. Ten cases were reported in Greene; of these, 9 recovered, and 1, a negro woman who had been ill with a chronic affection, died. Greensboro had no health board. Two members of the common council act as a sanitary committee.

I reported on these cases to the mayor and common council in the office of Dr. Gruselin, where had assembled all of the physicians but one, and many citizens of the town. The usual methods employed for controlling the disease were advised, and printed Service précis on diagnosis of smallpox were sent to the mayor and physicians. March 12, started for Vienna, Ga.

March 13: Arrived at Vienna and appeared before the grand jury, who acted in health matters in the absence of a board of health and county commissioners. They were informed of the existence of some cases of smallpox in Vienna, in which I had just made a diagnosis, and were advised of the usual sanitary work necessary under the circumstances. Service printed matter bearing on the subject was left with them.

March 14: Proceeded to Cordele and called upon the president of the board of health, on whose request I visited a number of recently developed cases of discrete smallpox, and believe that the disease was then epidemic in the town. Fortunately an officer of this Service had visited Cordele a short time previously and given the citizens valuable assistance in organizing a sanitary corps, which seemed to be doing good work within the corporate limits. Many cases of disease of the same type, however, were daily coming into the town from the county, and to prevent this I urged the board of health, physicians and citizens in meeting to petition the grand jury at Vienna, in session, to appoint a county board of health, whose duty it would be to enact regulations for quarantining contagious diseases and enforcing vaccination under pen-

alty. The petition was under way when I left for Tifton. The disease was mostly confined to negroes at Cordele. No fatalities.

March 15: Arrived at Tifton in a pouring rain. Met the mayor who informed me that their board of health recently organized was working nicely, and that of the 8 cases in town all were isolated and convalescent. Vaccination was being enforced, and much progress made in that direction in the town but not in the county. I left Tifton the same afternoon and went to Allapaha, spent the night, and early the next morning, March 16, started by private conveyance, with one of the county commissioners of Berrien County, for Nashville, the county seat, located about 15 miles from the railroad. Here I met the county commissioners and explained to them the work going on at Tifton to prevent the introduction and spread of smallpox, and advised them to enact a regulation for enforcing vaccination under penalty, which they did forthwith. Other advice relative to preventing the introduction and spread of the disease was given verbally and in printed form. Returning to Allapaha that evening I took the train for Tifton at 1.20 a. m., reached Tifton after 2 a. m., and about 6 a. m. boarded the train for Macon on my way to Monticello.

March 18: By invitation of the mayor of Monticello, several cases of smallpox were examined, all among whites. One of these cases, in a child under 5 years, was confluent and pronounced hopeless. Met the mayor, common council, and citizens in the council chamber, and spoke to them of the existence of smallpox in their midst, and that 1 of these cases probably would be fatal, and advised all precautionary measures against the spread of the disease.

March 19: Returned to Atlanta.

March 20: Went to West Point, saw the mayor and councilmen and one of the county commissioners. It was learned that some 16 cases of smallpox, about which there was no difference of opinion, were quarantined on a plantation 15 miles from West Point. All of these cases were negroes; they were under the care of a physician who was employed by Harris County and it was not deemed necessary to visit them. The mayor of West Point and councilmen were advised of the usual precautionary measures applicable to the situation. It appeared from reports that vaccination had been generally practiced at West Point one year previous.

March 23: Visited Sparta and on the morning of March 24 met the mayor, health officer, and chairman of the board of county commissioners and reported upon some cases examined that morning. The cases here were the most indefinite in character of all encountered. Most of these seemed to be of that variety of modified smallpox known as wart pox, in which small reddish elevations remain after desquamation instead of pits. Many of such cases have been noticed in every county visited by the eruptive diseases, now so prevalent throughout this State, and have caused some confusion among physicians when endeavoring to arrive at a diagnosis. These elevations seem always to be thickest on the cheek near the alae nasi and on the nose, where comedones are numerous. Acneous skins seem to furnish fruitful soil for the development of wart pox.

March 26: Went to Dallas in Paulding County. There were no cases of eruptive disease in the town but it was reported that there were some cases of light form among negroes living 10 miles out, also 1 case in the person of the physician who had attended the negroes. I rode out by private conveyance at the request of the ordinary of the county about 12 miles over a very badly cut up muddy road and saw the physician

who had a clearly developed case of smallpox which was confluent on the face and parts of the body. The village of Yorkville, where this case existed, was quite small, containing only about 50 inhabitants. I instructed the postmaster and ten or fifteen other citizens what should be done to prevent further developments of the disease. The ordinary of the county was given printed instructions on the management of smallpox.

March 28: Visited Toccoa on request of the mayor. Drove out about 7 miles into Franklin County to visit 2 cases of eruptive disease suspected of being smallpox, against which the town of Toccoa was taking proper precautions. These cases were pronounced smallpox. They were already quarantined with a physician. I met the mayor and council that evening and made my report. I also described to them the proper course to pursue in dealing with the prevention and spread of smallpox.

Respectfully,

T. B. PERRY,  
*Passed Assistant Surgeon, U. S. M. H. S.*

ATLANTA, GA., *April 14, 1900.*

SIR: I have the honor to report that upon my return to Atlanta from Toccoa, March 30, I was directed by the governor to proceed to Eatonton, Putnam County, Ga., and make a diagnosis in certain cases of eruptive diseases, about which physicians in that vicinity differed in opinion.

March 30: While on the cars between Macon and Eatonton the chairman of the board of health of Milledgeville and others, urged me to remain over in Milledgeville that night and on the following morning examine some suspicious cases of eruptive disease in the cadet barracks of the Middle Georgia Military and Agricultural College. Recognizing this as one of the most important school centers in the State, also the necessity for prompt action in determining the nature of the disease with which the physicians there were then contending, and dealing with the suppression of it afterwards, I remained in Milledgeville that night and saw the cases in the barracks on March 31—pronounced them suspicious and advised isolation and other usual measures for preventing the spread of contagious disease. On my return to Atlanta I wrote to the chairman of the board of health at Milledgeville, impressing upon him the importance of maintaining isolation in the suspects and requesting him to inform me of further developments which might enable me to make a positive diagnosis in these cases. I inclose herewith his letter received in reply thereto.

April 1: After spending the evening of the 31st in Eatonton, making inquiries of the physicians relative to the history of the eruptive diseases then prevalent there, I visited several persons—all negroes—who had recovered from such disease; some marked with very fine pits, while others showed distinct elevations here and there on the skin, suggesting the preexistence of wart pox. Later I visited a recently developed case of confluent smallpox in the person of a white male adult, who, I am informed, has since died. I saw on that occasion also a case of discrete smallpox in the person of a male adult negro. After visiting these cases I met the mayor and all of the physicians practicing in the town, reported to them the results of my investigations, described to them at length the usual procedures recommended for controlling the extension of smallpox, answered all their questions bearing upon the

subject, and furnished printed instructions embodying practically everything of importance in dealing with the disease.

April 3: Returned to Atlanta.

April 9: In response to a telegram from the president of the board of health of Milledgeville I returned to that place where there was no little excitement over the report that smallpox existed in the cadet barracks. I made a very careful examination of the individual cases and made notes in the nature of a clinical history for each, during the forenoon, and revisited the barracks in the afternoon to reexamine more carefully a particular case presenting a combination of symptoms which made an accurate diagnosis difficult. The disease had in this instance attacked a scrofulous diathesis, producing an eruption differing from any of the eruptive diseases with which I am familiar. I would imagine that it resembled "Yaws" both in its course and appearance. This patient had only that morning developed facial erysipelas and his family history showed that other members of his family had been attacked with idiopathic facial erysipelas.

In the evening I met the president of the board of health, the mayor, the president of the Girls' Industrial School, and reported the disease found at the barracks to be chicken pox, but advised continued isolation of the suspects and vaccination of all pupils and others connected with the school. I also advised that the cadets go into camp on the college grounds and that the barracks be thoroughly disinfected with formaldehyd gas, and otherwise, also, mechanically cleansed. A formaldehyd generator was ordered by telegraph and has by now been in use. It is my desire to return to Milledgeville in a short time to see that the work of disinfecting the barracks was complete and to advise in other sanitary matters tending toward the prevention of the spread of this eruptive disease or the introduction of others.

Respectfully,

T. B. PERRY,  
*Passed Assistant Surgeon, U. S. M. H. S.*

[Inclosure.]

MILLEDGEVILLE, GA., April 6, 1900.

SIR: Allow me to thank you for the carefully worded letter of the 3d instant.

Your card, published a few weeks ago in the Recorder, was most fortunate for me, for, acting on that advice, I ordered all of the pupils in the schools who could not show successful vaccination revaccinated.

The cases at the cadet barracks are doing as well as I could expect, but if there is any indication of further trouble I will wire for you.

I appreciate very decidedly the intense interest you feel in this matter and share it with you. You may rest assured that I will take all precautions against the spread of preventable diseases.

President Reynolds joins me in thanking you for your thoughtful direction of this matter.

Respectfully,  
T. B. PERRY, M. D.,

*Sanitary Advisor Governor, Atlanta, Ga.*

T. M. HALL.

*Resolutions concerning leprosy adopted by the board of health of the city of Los Angeles, March 19, 1900.*

Whereas, the recent discovery of a case of leprosy in this city has again called attention to the utter impossibility of properly isolating and caring for persons afflicted with this disease at either the city or county hospital; and

Whereas, in most if not all the cases of leprosy that have occurred in this city it is known that the disease was originally contracted in the Hawaiian Islands or other foreign countries; and